REMARKS

Claims 1, 2, 4-9 and 12-27 are all of the claims presently pending in the application. Claims 1, 16 and 20 have been amended to more particularly define the claimed invention. Claim 3 has been canceled without prejudice or disclaimer.

Entry of this Amendment is believed proper since no new issues are being presented to the Examiner that would require further consideration and/or search.

It is noted that the claim amendments are made only for more particularly pointing out the invention, and not for distinguishing the invention over the prior art, narrowing the claims or for any statutory requirements of patentability. Further, Applicant specifically states that no amendment to any claim herein should be construed as a disclaimer of any interest in or right to an equivalent of any element or feature of the amended claim.

Claims 1-2, 6, 14, 18, 19 and 24 stand rejected under 35 U.S.C. § 102(b) as being anticipated by IBM Technical Disclosure Bulletin (TDB-ACC-NO: NN75101486, Vol. 18, Issue 5) (hereinafter "IBM"). Claims 5, 15-17 and 27 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over IBM. Claims 4 and 15 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over IBM in view of Fujitsu LTD (JP 53016396A) (hereinafter "Fujitsu"). Claims 3, 12 and 26 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over IBM in view of Kawama et al. (U.S. Patent No. 5,665,607) (hereinafter "Kawama"). Claims 7-9, 13 and 20-25 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over IBM in view of Kamimura (JP 2000-036619).

These rejections are respectfully traversed in the following discussion.

I. THE CLAIMED INVENTION

The claimed invention (e.g., as defined in claim 1) is directed to a method of producing a crystal growth substrate including removing the seed substrate selectively from the sapphire substrate by performing chemical etching to the seed substrate on which the sapphire substrate is formed (e.g., see Application at page 3, line 17, through page 4, line 2 and Figure 1B). These features are important for improving the external quantum efficiency of a semiconductor light-emitting element, as well as light-condensing characteristics and light directivity (see Application at page 3, lines 9-15).

II. THE PRIOR ART REFERENCES

A. The IBM Reference

The Examiner alleges that IBM teaches the claimed invention of claims 1-2, 6, 14, 18, 19 and 24. Furthermore, the Examiner alleges that the claimed invention of claims 5, 15-17 and 27 would have been obvious in view of IBM. Applicant submits, however, that IBM does not teach or suggest each and every feature of the claimed invention.

That is, IBM does not teach or suggest "*removing said seed substrate selectively from said sapphire substrate by performing chemical etching to said seed substrate on which said sapphire substrate is formed*", as recited in claim 1, and similarly recited in claims 7 and 20.

The Examiner attempts to rely on Figures 2B-2D and the Abstract of IBM to support her allegations. The Examiner, however, is clearly incorrect.

That is, nowhere in these figures nor the Abstract does IBM teach or suggest removing the seed substrate selectively from the sapphire substrate by performing chemical etching to the seed substrate on which the sapphire substrate is formed. Indeed, the Examiner does not

even allege that IBM teaches or suggests this feature. The Examiner concedes that IBM "does not teach etching the sapphire substrate" (see Office Action dated March 24, 2006 at page 5). Furthermore, IBM merely teaches removing silicon from a sapphire styli by evaporation or contact with a high degree Cu plate (see IBM at Abstract, lines 22-24).

Moreover, IBM does not teach or suggest "*wherein said cavities are arranged two-dimensionally in said sapphire growth surface of said seed substrate*", as recited in exemplary dependent claim 6.

The Examiner alleges that "IBM publication also discloses broadly forming sapphire styli array, which inherently means periodically two-dimensional" (emphasis added by Examiner) (see Office Action dated March 24, 2006 at page 2). The Examiner, however, is incorrect for several reasons.

First, IBM does not teach or suggest forming a sapphire styli array. IBM merely teaches a series of sapphire styli (see IBM at Abstract).

Second, the claimed invention does not recite forming a sapphire styli array. Indeed, the claimed invention, of exemplary dependent claim 6, recites that the cavities are arranged in a two-dimensional array in the sapphire growth surface of the seed substrate. Therefore, even assuming that IBM teaches forming a sapphire styli array, *arguendo*, IBM fails to teach or suggest the limitation of exemplary dependent claim 6.

Third, the Examiner's allegation that a sapphire styli array "inherently means periodically two-dimensional" (see Office Action dated March 24, 2006 at page 2) is clearly erroneous. An array merely refers to an orderly arrangement. The arrangement may take on any formation, not necessarily a two-dimensional arrangement. Therefore, since IBM provides no support for a periodic two-dimensional array, the Examiner's rejection of claim 6 is erroneous.

Similarly, IBM does not teach or suggest that "*said cavities are uniformly spaced along said sapphire growth surface*", as recited in exemplary claim 18.

Applicant submits that the claimed invention recites a silicon seed substrate (e.g., 200; we would point out that reference numerals are provided merely for exemplary purposes are not meant to limit the subject matter of the claimed invention in any manner) including a plurality of cavities (e.g., 200a) formed in the silicon seed substrate (e.g., as depicted in Figure 2(b)). In accordance with the exemplary embodiment recited in dependent claim 6, the cavities (e.g., 200a) may be formed in an array (e.g., as depicted in Figure 2(a)).

The claimed invention further recites forming a sapphire crystal on the seed substrate (e.g., 200) to form a sapphire substrate (e.g., 101). By providing the plurality of cavities (e.g., 200a) in the seed substrate (e.g., 200), a plurality of protrusions (e.g., 101a) may be formed on a surface of the sapphire substrate (e.g., 101) (e.g., as depicted in Figure 1A).

These features are not taught or suggested by IBM. Indeed, IBM merely teaches a method of forming a series of sapphire styli. The method includes forming a silicon wafer that is anistropically etched to form a single etching pit. The wafer is used to produce a single sapphire plate (e.g., see IBM at Figure 2D). The single sapphire plate may be subsequently cut into various sapphire styli (e.g., see IBM at Abstract). No cavities are formed on the silicon substrate and no protrusions are formed on the resulting sapphire styli.

During the several previously conducted interviews with the Examiner, the Examiner appears to allege that since a plurality of styli may be formed, there must be a plurality of etching pits formed in an array and that these etching pits teach the cavities of the claimed invention. The Examiner, however, is clearly incorrect.

As explicitly stated in the Abstract of the IBM, a single sapphire plate is formed in the single etching pit. IBM teaches that "the resulting sapphire plate thus produced is

subsequently cut into the various styli required" (see IBM at Abstract).

Furthermore, even assuming, *arguendo*, that IBM provided a plurality of etching pits, IBM would still fail to meet the limitations of the claimed invention. That is, even if IBM included a plurality of etching pits, IBM would merely produce a plurality of sapphire styli. However, none of the sapphire styli would include a plurality of protrusions formed thereon, as provided in Figure 1A of the Application, and recited in the claimed invention of exemplary dependent claim 24.

Therefore, Applicant submits that there are elements of the claimed invention that are neither taught nor suggested by IBM. Therefore, the Examiner is respectfully requested to reconsider and withdraw this rejection.

B. The Fujitsu Reference

The Examiner alleges that Fujitsu would have been combined with IBM to teach the claimed invention of claims 4 and 15. Applicant submits, however, that, even if combined, the alleged combination of references would not teach or suggest each and every element of the claimed invention.

That is, neither Fujitsu, nor IBM, nor any combination thereof, teaches or suggests "*removing said seed substrate selectively from said sapphire substrate by performing chemical etching to said seed substrate on which said sapphire substrate is formed*", as recited in claim 1, and similarly recited in claims 7 and 20.

Indeed, as detailed in section A, we would argue that IBM does not teach or suggest this feature. Furthermore, Applicant submits that Fujitsu fails to make up the deficiencies of IBM.

The Examiner alleges that Fujitsu teaches a method of growing sapphire on a silicon

substrate at a temperature of 600°C and heat treating the grown sapphire at a temperature of 1270°C to form an alpha sapphire substrate. The Examiner attempts to rely on the Abstract of Fujitsu to support her allegations. The Examiner, however, is clearly incorrect.

That is, nowhere in this passage does Fujitsu teach or suggest removing the seed substrate selectively from the sapphire substrate by performing chemical etching to the seed substrate on which the sapphire substrate is formed. Indeed, the Examiner does not even allege that Fujitsu teaches or suggests this feature.

Thus, Fujitsu fails to make up the deficiencies of IBM.

Therefore, Applicant submits that even if combined, the alleged combination of references would not teach or suggest each and every feature of the claimed invention. Therefore, the Examiner is respectfully requested to reconsider and withdraw this rejection.

C. The Kawama Reference

The Examiner alleges that Kawama would have been combined with IBM to teach the claimed invention of claims 3, 12 and 26. Applicant submits, however, that, even if combined, the alleged combination of references would not teach or suggest each and every element of the claimed invention.

That is, neither Kawama, nor IBM, nor any combination thereof, teaches or suggests "*removing said seed substrate selectively from said sapphire substrate by performing chemical etching to said seed substrate on which said sapphire substrate is form*", as recited in claim 1, and similarly recited in claims 7 and 20.

Indeed, as detailed in section A, Applicant submits that IBM does not teach or suggest this feature. Furthermore, Applicant submits that Kawama fails to make up the deficiencies of IBM.

The Examiner alleges that Kawama teaches etching silicon to separate the silicon from sapphire using HF. The Examiner attempts to rely on Figure 13b and column 23, lines 27-40 of Kawama to support her allegations.

However, nowhere in this passage or this figure (nor anywhere else for that matter) does Kawama teach or suggest removing the seed substrate selectively from the sapphire substrate by performing chemical etching to the seed substrate on which the sapphire substrate is formed.

The Examiner has rejected claim 3 (the subject matter of which has herein been incorporated into independent claim 1) by alleging that Kawama at Figure 13b and column 23, lines 27-40 discloses growing a semiconductor layer (3) on the sapphire substrate before etching silicon (3) to be separated from the sapphire (1) using HF. Applicant, however, respectfully disagrees.

According to Kawama (see Kawama at column 23, lines 27-44 and Figure 13b), Kawama separates the semiconductor film (3) and the substrate (1) by forming the through-hole (8) on the semiconductor film (3), and immersing the wafer in hydrofluoric acid to etch away the intermediate silicon oxide film (2) through the holes (8). At this point, Kawama (see Kawama at column 34, lines 11-13) discloses that the substrate may include sapphire. That is, Kawama aims at removing the intermediate silicon oxide film (2), which is formed on the sapphire substrate (1), by etching. However, such disclosure is completely unrelated to the claimed feature, in which the seed substrate, on which the sapphire substrate is formed, is removed by etching.

Thus, Kawama fails to make up the deficiencies of IBM.

Therefore, Applicant submits that even if combined, the alleged combination of references would not teach or suggest each and every feature of the claimed invention.

Therefore, the Examiner is respectfully requested to reconsider and withdraw this rejection.

D. The Kamimura Reference

The Examiner alleges that Kamimura would have been combined with IBM to teach the claimed invention of claims 7-9, 13 and 20-25. Applicant submits, however, that, even if combined, the alleged combination of references would not teach or suggest each and every element of the claimed invention.

That is, neither Kamimura, nor IBM, nor any combination thereof, teaches or suggests "*removing said seed substrate selectively from said sapphire substrate by performing chemical etching to said seed substrate on which said sapphire substrate is formed*", as recited in claim 1, and similarly recited in claims 7 and 20.

Indeed, as detailed in section A, IBM does not teach or suggest this feature. Furthermore, the Examiner does not even allege that Kamimura teaches or suggests this feature. Thus, Kamimura fails to make up the deficiencies of IBM.

Therefore, Applicant submits that even if combined, the alleged combination of references would not teach or suggest each and every feature of the claimed invention. Therefore, the Examiner is respectfully requested to reconsider and withdraw this rejection.

III. FORMAL MATTERS AND CONCLUSION

In view of the foregoing, Applicant submits that claims 1, 2, 4-9 and 12-27, all of the claims presently pending in the application, are patentably distinct over the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue at the earliest possible time.

Should the Examiner find the application to be other than in condition for allowance,

the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary in a telephonic or personal interview.

The Commissioner is hereby authorized to charge any deficiency in fees or to credit any overpayment in fees to Attorney's Deposit Account No. 50-0481.

Respectfully Submitted,

Date: May 24, 2006

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I hereby certify that I am filing this paper via facsimile, to Group Art Unit 2812, at (571) 273-8300, on May 24, 2006.

Respectfully Submitted,

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